

**Oroville Facilities Relicensing Efforts
Draft Narrative Reports for PM&E Discussion**

Resource Action: EWG-73

Task Force Recommendation Category: 1

**CONTROL AND/OR ERADICATION OF PURPLE LOOSESTRIFE
IN THE PROJECT AREA**

Description of Potential Resource Action:

This Resource Action involves the eradication and/or control of purple loosestrife (*Lythrum salicaria*) in the Project area, mainly the Thermalito Complex, and to replant/restore with appropriate native plants where necessary. Control methods may include a combination of mechanical, manual, and chemical efforts. It will require multiple-year treatments and monitoring. It is expected that treatments will be more intense in the first few years and will lessen in both labor and chemical costs in each preceding year.

There are two parts to this Resource Action: 1) control of noxious weed species and 2) restoration with native plants. This Resource Action (EWG 73) originally targeted all noxious weed species in the Thermalito Complex, while other Resource Actions (listed below) targeted noxious weed species in the OWA, areas around Lake Oroville, and low flow section of the Feather River. EWG 73 now addresses only purple loosestrife in the project area, mainly the Thermalito Complex. EWG 74 addresses all other noxious weed species in the project area. EWG 70 addresses weed species in the low flow section of the Feather River outside the project area. EWG 75 addresses water primrose in the OWA.

- EWG70: proposes to control noxious weed species in the Low Flow channel of the Feather River
- EWG 74A: proposes to control noxious weed species and to replant with native species in the OWA
- EWG 74B: proposes to control noxious weed species and to replant with native species around Lake Oroville
- EWG 75: proposes to control the spread of noxious plant species (water primrose) in the OWA by developing management protocols
- EWG 76: proposes to control noxious plant species in the OWA by altering the hydrologic regime to one that would support and protect native riparian vegetation

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Nexus to Project:

Fluctuating water levels in the Thermalito Complex promote the proliferation of purple loosestrife. This species may then be dispersed into downstream waters and irrigation canals.

Potential Environmental Benefits:

Purple loosestrife replaces wintering waterfowl nesting habitat. Control of this noxious weed species and replacement with native plant species will enhance native vegetation and associated wildlife. Eradication and/or control will help reduce the number of seeds and/or plant parts (with potential to invade other sensitive resources and habitats) that are flushed into downstream irrigation canals and the Feather River channel.

Potential Constraints:

- Presence of threatened or endangered species and/or critical habitat
- Presence of other species of concern
- Timing of treatments that coincide with restrictions that may be identified during USFWS or NOAA consultations

Existing Conditions in the Proposed Resource Action Implementation Area:

The Thermalito Afterbay and the Thermalito Forebay are shallow reservoirs with gently sloping banks. The Afterbay is operated as a temporary storage pool for pump-back operations, resulting in frequent water surface fluctuations. The pool elevation of the Forebay and the Diversion Pool remains fairly constant throughout the year. The frequent fluctuations within the Afterbay have created optimal conditions for the rapid invasion of purple loosestrife within the drawdown zone of the reservoir.

Purple loosestrife is a common invader of wetland habitats including stream and river banks, edges of ponds, lakes, and reservoirs, flooded areas, and ditches (Bossard 2000). It displaces native plant species through rapid growth and heavy seed production and forms dense stands that are unsuitable as cover, food, or nesting sites for a wide range of native animal species. Each plant can produce up to two million seeds which are long-lived and are shed gradually from capsules through the winter, contributing to a large seed bank (Figure 1). This species thrives on disturbed, moist soils that have been disturbed or degraded from draining, natural drawdown, and shore manipulation (TNC 2001).

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Figure 1. Purple loosestrife in flower



This species is currently listed by the California Department of Food and Agriculture as a “B” rated pest and as a “species with potential to spread explosively” by the California Invasive Pest Species Council. A purple loosestrife eradication and control program has been the target of a state-wide eradication effort by the California Department of Food and Agriculture and other interested agencies/organizations, including the Department of Water Resources, the Department of Fish and Game, and the Department of Parks and Recreation.

Control efforts for purple loosestrife within project area include a three year mapping and control effort by DPR. During 2001, 2002, and 2003, DPR has treated purple loosestrife along 3 miles of shoreline (~20 acres) of the Thermalito Forebay and Diversion pool. Each succeeding year, it was found in roughly the same shoreline distribution, but much reduced in number. The amount of herbicide needed for treatment also decreased each year.

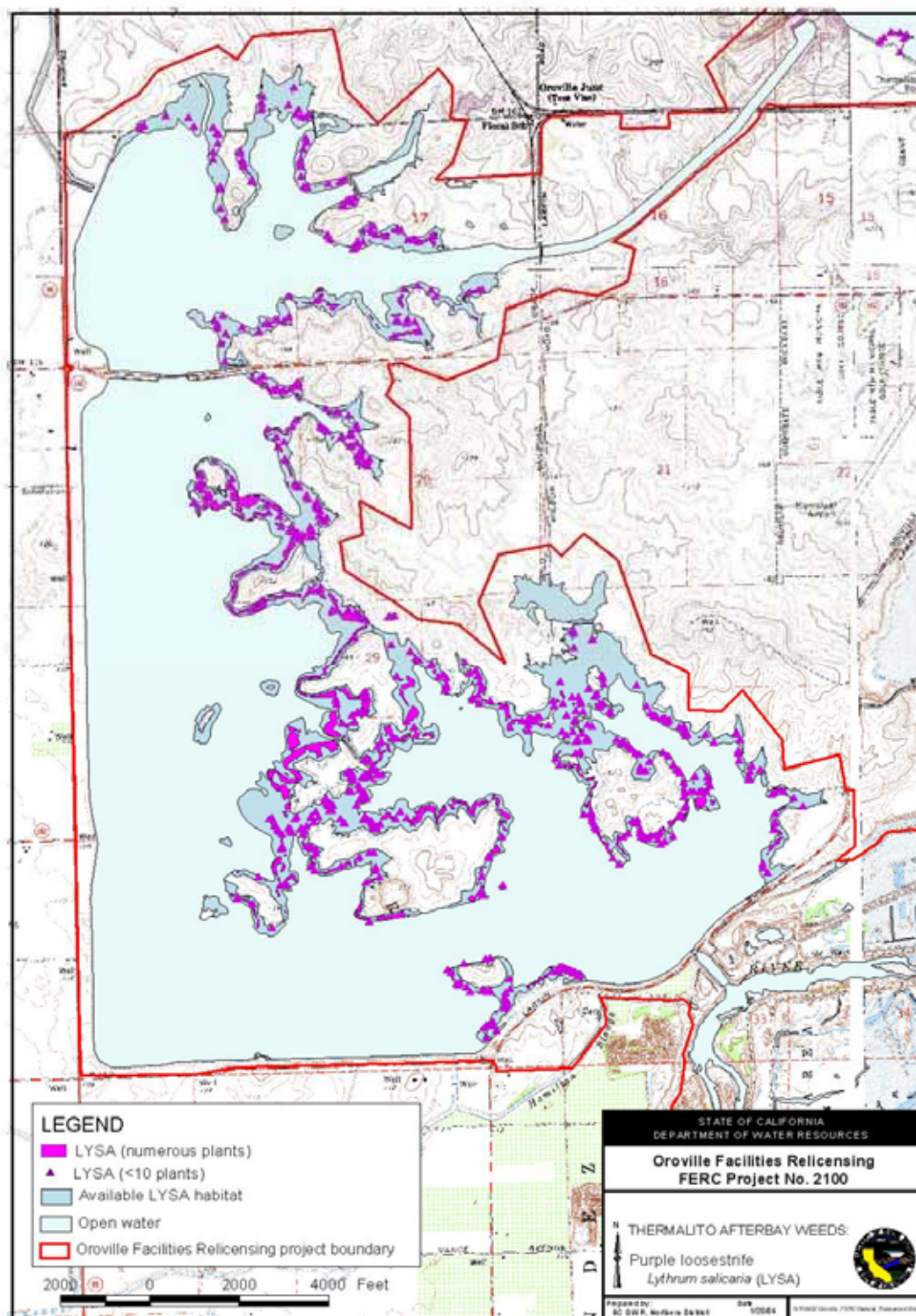
In 2002, DFG along with CDFA, DWR, and the Butte County Agriculture Department conducted aerial treatment for purple loosestrife around the Thermalito Afterbay and portions of the Oroville Wildlife Area.

During 2002 and 2003, DWR personnel mapped purple loosestrife in the project area, low-flow section of the Feather River, and downstream Feather River below the project area. Approximately 85 of the ~900 acres of wetland/riparian margin of the Thermalito Afterbay contain varying densities of purple loosestrife (Figure 2), with another 20 acres around the Thermalito Forebay (Figure 3). There are also a few scattered locations around the Diversion Pool, along the low flow section of the Feather River (Figure 4), and in the Oroville Wildlife Area (Figure 5).

Control methods for purple loosestrife usually depend upon the age and size of the infestation. All methods require appropriate timing (when flowers are visible during summer months) and follow-up control and monitoring. Physical control (hand

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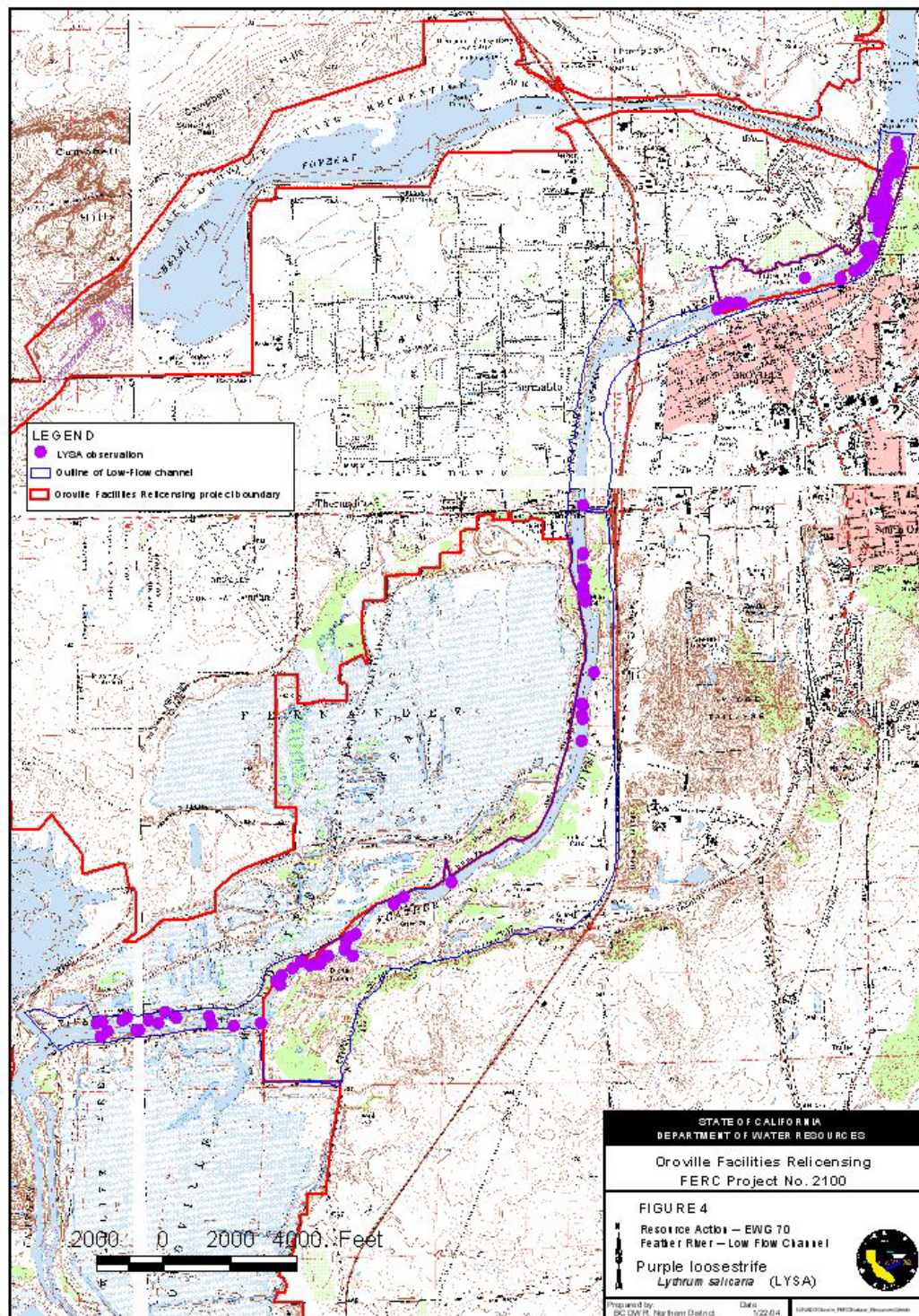
Figure 2. Purple loosestrife around Thermalito Afterbay.



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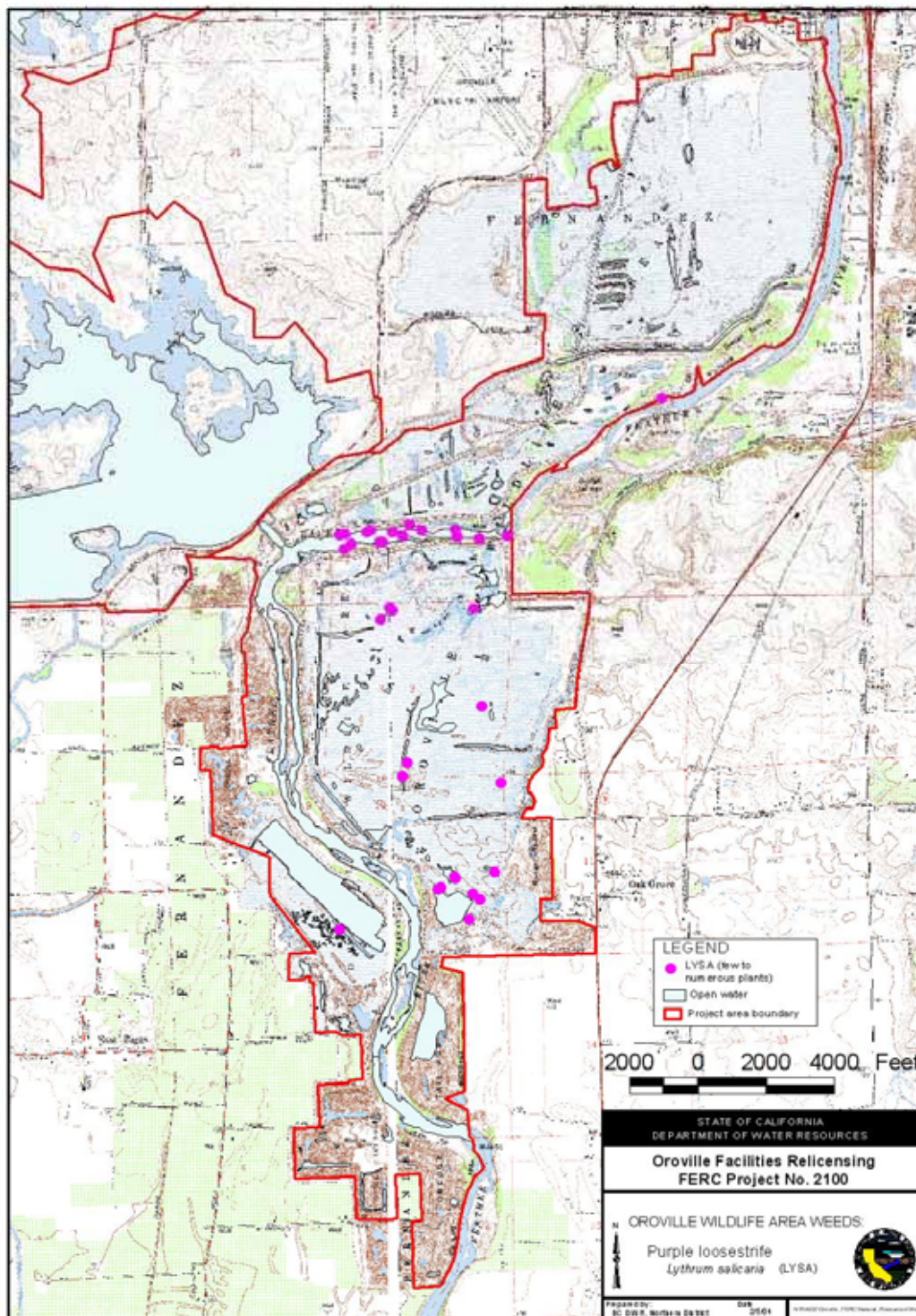
Figure 4. Purple loosestrife along low flow section of Feather River.



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Figure 5. Purple loosestrife in Oroville Wildlife Area.



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pulling) can be used in areas with small stands. Glyphosate (Rodeo/Roundup) is the most common herbicide used to control purple loosestrife. Rodeo is approved for use in aquatic environments. However, glyphosate is a non-selective herbicide that kills all vegetation, including surrounding native vegetation that is critical in the recolonization of the site. Application by hand sprayers can be used to decrease the impact to surrounding vegetation, including habitat for special status species.

Design Considerations and Evaluation:

Control efforts for purple loosestrife are most effective when conducted during July and August when the plants are flowering and most visible. Control efforts will need to be a yearly event. However, it is estimated that efforts will be more concentrated in the first year or two, with lighter follow-up controls in each of the following years as eradication and/or control of the populations are achieved. A monitoring regime should be put in place that will inventory and map priority weed species as well as identify the effectiveness of the control methods. The monitoring program should identify areas that are not naturally regenerating and need to have follow-up restoration at the site.

Restoration:

Restoring/planting with native species may be necessary following control treatments in areas where purple loosestrife densities are high. Planting with native species will help reduce the threat of reinvasion by purple loosestrife. These areas should be replanted with native emergent wetland species, such as rushes (*Juncus effuses*), sedges (*Carex* sp.) bulrush (*Scirpus acutus*), and cattails (*Typha* sp.).

Permitting:

Consultations with NOAA and USFWS may be necessary if any impacts to federal special status species are identified. A DFG 1601 permit and Army Corps of Engineers 404 permit may be needed for restoration activities.

A NPDES permit may be needed from the State Water Resources Control Board.

Synergism and Conflicts:

The goal of this resource action is to eliminate and/or control purple loosestrife in the project-affected area. Other resource actions listed above address weed control in the OWA, Thermalito Complex, around Lake Oroville, and in the low-flow reach of the Feather River. Each of these resource actions also has a replanting/restoration component. An overall Weed Management Plan for the Project Area would increase the likelihood of success for eradication and control of the target species and ultimately decrease the invasion into downstream waters and habitats.

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Removal of noxious weed species and replanting with native species would compliment those resource actions that address riparian/wetland and upland habitats, as well as those that address special status species habitats.

No potential conflicts with other resources or resource actions have been identified at this time.

Uncertainties:

Uncertainties include:

- effectiveness of control and eradication methods
- long-term costs
- determining time frame for controlling weed populations
- impacts to plant and animal species that may be added to special status lists in the future

Cost Estimate:

An initial cost estimate for this resource action is difficult because:

- costs will vary depending on method or methods used. A mix of techniques may be appropriate
- a weed control and restoration plan in the low-flow channel will be part of an larger weed management plan for the Project Area
- the uncertainties in predicting success of management methods and advances in technology or strategies over time
- costs will be higher for the first year or two, but should decline over time
- may be more cost effective to use consultant services for purple loosestrife control

The following are anticipated costs for Year 1 and Year 2. The actual costs may vary greatly from the estimated costs due to differences in hourly wage, consultant costs, etc. Costs should decrease over time.

	Thermalito Afterbay ~85 acres	Thermalito Forebay ~20 acres	OWA, Diversion Pool, low flow section Feather River	Total
Labor	680 hrs @\$70/hr \$47,600	160 hrs @ \$70/hr \$11,200	50 hrs @ \$70/hr \$3,500	\$62,300
Herbicides				\$1,500
Equipment				\$5,000
Permitting				\$5,000
Monitoring				\$8400

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Restoration costs: ~ \$250 - \$800 per acre (probably low end for wetlands spp.)
~ uncertain as to number of acres to be restored

Recommendations:

This resource action should be combined with other resource actions that target the eradication and/or control of noxious weed species. A weed management plan for the project area and project-affected area should be developed using an adaptive management strategy. This plan should include management goals and objectives, priorities, implementation strategies, cost and time estimates, restoration, and monitoring to assess impacts of management activities and effectiveness of methods.

Literature Cited:

Bossard, C.C., J.M. Randall, and M.C. Hoshovsky (eds.) 2000. Invasive Plants of California 's Wildlands. University of California Press, Berkeley, California.

The Nature Conservancy. 2001. Element Stewardship Abstract for *Lythrum salicaria*. Arlington, Virginia. November 2001.